

**How Do CEOs Make Investment Decisions in Their Early Years of Tenure? Evidence from  
Investment Efficiency**

Abstract

Career concerns are escalated during the early years of a CEO's tenure because the market is uncertain about the new CEO's ability and the compatibility between his or her skills and the firm's strategic needs. This study examines whether such increased career concerns induce investment inefficiency during the early years of a CEO's tenure. I find that underinvestment is more likely to happen in the early years than in the later years, and that the underinvestment problem is most evident when the CEO is externally appointed, holds an interim position, and has low managerial ability, and when the firm has a higher level of information asymmetry and lower financial reporting quality. I also find that firms are less likely to issue debts during those early years, which suggests that a reduced supply of capital can contribute to the underinvestment phenomenon in the early years of a CEO's tenure. Together, these findings indicate that during the early years of a CEO's service, especially in contexts where career concerns are high and the information environment is more asymmetric, investment inefficiency is more likely to occur.

*Keywords* Investment efficiency · Underinvestment · CEO tenure · CEO turnover · Career concerns · Information asymmetry

## **How Do CEOs Make Investment Decisions in Their Early Years of Tenure? Evidence from Investment Efficiency**

### **1. Introduction**

Having a new CEO onboard significantly affects the management information environment of a firm and create uncertainty to some degree. First, the new CEO's ability and how well his or her skills will fit the firm are uncertain to the top management team, the board of the directors, and the capital market (Fama, 1980; Holmstrom, 1982; Hermalin and Weisbach, 1998; Bills et al., 2017). Second, in the early years of a CEO's tenure, career concerns arising from the CEO's job security, subsequent job market competitiveness, future compensation, and managerial autonomy can affect his or her risk-taking preferences and the tendency to share information relevant to firm decision making with the board (Holmstrom, 1982). Such uncertainty and the changes to the management information environment can negatively affect firms' capital allocation and investment decisions. This study investigates the firm's investment efficiency in the few years following a new CEO's appointment.

The intensified career concerns in the early years of a CEO's tenure are likely to cause the CEO to distort investment decision making process, leading to investment inefficiency. For one thing, CEOs can act aggressively to impress the board of directors and inform the capital market about his or her capability as soon as possible (Prendergast and Stole 1996). Coles et al. (2006) also show shorter-tenured CEOs make more aggressive investments in research and development expenditure (R&D, hereafter) than longer-tenured CEOs. However, overinvestment may not necessarily occur because the board may exert stronger monitoring due to the uncertainty of the CEO's ability during the first years of his/her tenure (Hermalin and Weisbach 1998; Dikolli, Mayew, and Nanda 2014). The interaction between the career concerns of the CEO and the board

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

will affect the information sharing between the board and the CEO and the project screening strength from the board.

For another thing, new CEOs can be conservative when allocating resources and making investment decisions, because they are less familiar with a new firm's operating environment, or they have been promoted to a position that demands different skills and information than the prior position (Holmstrom, 1982; Cadman et al., 2016). Holmstrom (1999) states that managers underinvest relative to the optimal level, because risky investment may reveal their true ability, which may compromise their future compensations. A more recent study, Chen and Zhang (2014), shows that as a CEO's tenure gets longer, he/she becomes more risk-taking. With a risk-averse tendency during early years of tenure, CEOs can withhold project information and bypass investment opportunities that match firm-specific characteristics and fit the firms' strategies, or exhibit herding behavior by ignoring their own private information about payoffs and copying the decisions of previous managers or other firms in the same industry (Scharfstein and Stein, 1990). Such practices can lead to underinvestment. In addition, with the uncertainty about the ability of a new CEO during the first few years of tenure, the market may respond by rationing capital and reducing capital supply, restricting financial resources which could exaggerate underinvestment issues if the firm needs to raise funds to finance an existing positive net present value project (Myers and Majluf 1984).

Using the data for the period 1992–2016 and following the method of Biddle et al. (2009), I find that underinvestment is more likely to happen during the early years (i.e., the first two years) than in the other years of a CEO's tenure. I do not find evidence of overinvestment during the early years of a CEO's tenure. A battery of robustness tests provides consistent support for the main finding of underinvestment during the early years of a CEO's tenure. These tests include defining

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

“early years” as the first three years, using alternative measures to indicate firms’ likelihood of over- and underinvesting, examining specific types of investments (i.e., capital expenditures and non-capital expenditures that include R&D and acquisition expenditures), and controlling for the last years of a CEO’s tenure.

I further conduct cross-sectional analyses to investigate whether the inefficiency in investments in the early years of a CEO’s tenure is more pronounced in certain contexts where career concerns and information asymmetry are more severe. Specifically, I examine how the degree of inefficiency varies with succession type (i.e., externally appointed versus internally promoted CEOs, permanent versus interim CEOs), the ability of the new CEOs, firms’ financial reporting quality, and firms’ information environment (i.e., high versus low information asymmetry).

Externally appointed CEOs face a greater risk of termination and usually lack firm-specific knowledge during their early years with the firm (Harris and Helfat, 1997; Gillan et al., 2009). I find that underinvestment is more evident during the early years of externally hired CEOs but not internally promoted CEOs. Interim CEOs may have no incentives to make investments due to their temporary positions; however, for those who have promotion expectations, they tend to boost short-term performance to improve their promotion prospects (e.g., Ballinger and Marcel, 2010; Chen et al., 2015). I show that interim CEOs exhibit pronounced underinvestment during their early years of service. Higher ability CEOs generate more precise estimates of underlying profitability of the projects and respond to the economic environment more quickly than their less able counterparts. More able CEOs are also more confident about their own opinion and the project information they collect and share with the board (Prendergast and Stole 1996). Relative to more able CEOs, less able CEOs may ignore and withhold their own private information about payoffs

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

and copy the decisions of previous managers because they are more concerned about their career and reputation, which leads to investment inefficiency (Scharfstein and Stein, 1990; Jian and Lee, 2011; Gan, 2019). I find that low-ability CEOs but not high-ability CEOs tend to underinvest during their early years of tenure. In addition, high information asymmetry can significantly increase monitoring costs and impede monitoring effectiveness; it can also negatively affect the flow of capital from external suppliers from external suppliers to the firms. As a result, investment inefficiency problem can be more pronounced if the information environment of the firm is highly asymmetric (e.g., Myers and Majluf, 1984; Bushman and Smith, 2001; Healy and Palepu, 2001; Biddle and Hilary, 2006; Lambert et al., 2007; Biddle et al., 2009; Garcia Lara et al., 2016). I find that the underinvestment phenomenon during the early years of CEO tenure is most pronounced in firms that have high information asymmetry and low financial information quality.

Last but not least, additional analyses of firms' likelihood of issuing equity and debt show that during the early years of a CEO's tenure, firms are less likely to issue debt but not equity. The results also show that firms issue less debt during the early years of externally appointed CEOs, interim CEOs, and low-ability CEOs.

This study makes the following contributions. First, it provides further insight into the investment pattern during a CEO's tenure given various levels of career concerns and the characteristics of the information environment. Pan et al. (2016) document that disinvestment decreases over a CEO's tenure while investment increases, and that investment quality deteriorates over a CEO's tenure. They argue that this cyclical phenomenon is due to agency problems (i.e., the CEO gains more control over the board) and is widespread regardless of the type of CEO turnover, the new CEO's succession origin, the CEO's time in office, and the industry conditions at the time of turnover. My study takes a different angle by investigating investment efficiency

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

during the early years of a CEO's tenure. Although Pan et al. (2016) show that investment increases over a CEO's tenure, it is unknown whether the relatively low investment level in the early stage of CEO tenure is efficient or not, because firms operate in various settings prone to overinvestment or underinvestment. Such research question is critical because hiring a new CEO is a strategic move for most firms, and inefficient investment decisions in the early stage of a CEO's tenure could prevent the firm from realizing its strategic goals and could impair firm growth and value in the long run. My study shows that underinvestment does exist during the early years of a CEO's tenure, and its magnitude depends on the type of the new CEO, the ability of the new CEO, and the information environment of the firm. The findings of my study imply that boards of directors may want to pay attention to particular types of CEO succession and the information environment when they are in a situation to evaluate and make recommendations for investments. Boards might do well to provide varying levels of support and/or adjust monitoring strength to promote investment efficiency following CEO turnover, so that the firm can benefit from constant and long-term growth.

Second, this study extends the literature on myopic managerial behaviors following CEO turnovers. For example, Strong and Meyer (1987), Elliott and Shaw (1988), DeAngelo (1988), and Pourciau (1993) show that new CEOs overstate their firms' expenses and losses in their first year of service (i.e., they take a big bath). Chen and Zhang (2014) find that CEOs' risk-taking behavior is positively associated with their tenure. Ali and Zhang (2015) show that there is a greater propensity to overstate earnings in the early years than in the later years of CEOs' service. My study adds evidence to this stream of literature by substantiating that underinvestment exists during the early years of a CEO's tenure due to career concerns and information asymmetry.

Third, this study contributes to the research stream on how managerial attributes can influence firms' investment practices. Bertrand and Schoar (2003) and Fee et al. (2013) document that variations in firms' investment policies are significantly explained by manager fixed effects and managerial attributes. Denis and Denis (1995) find that capital expenditures and the number of employees decrease after forced CEO turnovers occur. Weisbach (1995) finds an unusually high likelihood of divesting poorly performing deals following CEO turnovers. Coles et al. (2006) show that as CEOs get longer tenure, they pursue stability in R&D investment. A recent study, Xie (2015), focuses on the firms in China and shows that newly appointed CEOs in Chinese firms tend to invest more efficiently, which supports the argument that new CEOs would like to make efficient investment decisions to build up their long-term reputation. My study extends this line of research by showing that new CEOs exhibit different levels of underinvestment in their early years of service, depending on the type of succession, the CEO's ability, and the level of information asymmetry in the environment.

The remainder of this paper is organized as follows. In Section 2, I discuss the related literature and develop our hypotheses. In Section 3, I describe the research design. Section 4 discusses the results, Section 5 provides additional analyses, and Section 6 presents robustness tests. I conclude our study in Section 7.

## **2. Literature review and hypothesis development**

### ***2.1 Career concerns in the early years of CEO tenure***

According to Gibbons and Murphy (1992), managers experience career concerns when employers use their current performance to assess ability and set compensation. In this study, I focus on CEOs' career concern in their early years of service and how it affects corporate investment efficiency. Career concern during the early years of CEO tenure can be severe, because

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

the market and creditors are still uncertain about and are assessing the CEO's ability (Fama, 1980; Holmstrom, 1982; Hermalin and Weisbach, 1998). Even for an internally promoted CEO, the market may still be uncertain about the CEO's ability, as the skills required to be a successful CEO are different from the skills required in lower-level positions (Gibbons and Murphy 1992). The market's perception and recognition of a new CEO's ability is critical to the CEO because it will affect the CEO's job security, subsequent job market competitiveness, future compensation, and managerial autonomy (e.g., Fama, 1980; Hermalin and Weisbach, 1998). Consistent with this view, Ali and Zhang (2015) and Cadman et al. (2016) conjecture that CEOs with less tenure are in a more uncertain position with the firm and therefore face a higher risk of dismissal. Due to such career concerns, CEOs with less tenure tend to make prudent managerial decisions, and they work hard to perform well and establish their reputations in the market (Holmstrom, 1982).

The career concerns discussed above create pressure and lead to myopic managerial behavior. For instance, existing studies provide empirical evidence that new CEOs overstate their firms' expenses and losses in their first year of service, attributing them to the previous CEOs so that they can take credit for higher earnings in subsequent years (e.g., Strong and Meyer, 1987; Elliott and Shaw, 1988; DeAngelo, 1988; Pourciau, 1993). Ali and Zhang (2015) show that there is a greater propensity to overstate earnings in the early years than in the later years of CEOs' service, consistent with the conjecture that new CEOs aim to inform the market about their ability in their early years of service when the market is more uncertain (Ali and Zhang, 2015). Supporting Ali and Zhang's (2015) findings, Bills et al. (2017) report that audit fees are higher in the early years of a CEO's service, because the perceived risk of financial reporting violations is higher in those years due to market's uncertainty about firms' future operations and financial policies, as well as the potential motivation for earnings management introduced by management succession.



## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

Career concerns also have consequences to the quality of management forecast. For example, Pae, Song, and Yi (2016) find that short-tenured CEOs are more likely to issue downward earnings guidance when they have bad news.

Regarding investment patterns in the early years of CEOs' service, Weisbach (1995) shows that at the time of a CEO change, firms are more likely to divest an acquisition at a loss or divest an acquisition considered unprofitable by the press. Du and Lin (2011) find that new CEOs with high options-based compensation, CEOs who are hired after a forced turnover, and CEOs with shorter organization tenure are associated with high R&D and advertisement investments. Cadman et al. (2016) show evidence that having *ex ante* severance pay contracts can mitigate CEOs' propensity to be risk averse during their early years of service and provide them with insurance for their human capital and incentives to invest in risky positive-NPV projects. Finally, Pan et al. (2016) document a pattern of increasing investments over the CEO cycle, although the authors do not claim to know whether or not the investments are efficient. Xie (2015) shows that newly appointed CEOs tend to invest efficiently in Chinese firms by documenting an enhanced effect brought by newly appointed CEOs to the positive association between Tobin's Q and investment levels, consistent with a long-term career concerns perspective that newly appointed CEOs want to build up their reputation in the long run.

### ***2.2 Hypothesis development***

According to the neoclassical framework, firms invest until the marginal benefit of capital investment equals the marginal costs, and managers obtain financing for positive net present value projects at the prevailing economy-wide interest rate and return the extra cash to investors (e.g., Yoshikawa, 1980; Abel, 1983). In settings where investment opportunities are being considered and decisions are being made, the CEO is responsible for generating project ideas and identify

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

investment opportunities. In this process, the CEO controls the information available to the board and the board exerts its advisory function by evaluating the potential investment opportunities (Adams and Ferreira 2006; Song and Thakor 2006). The precision of the information shared by the CEO to the board affects the board's project choice recommendations and thus investment efficiency of the firm (Song and Thakor 2006).

As discussed above, CEOs face intense career concerns during the early years of their tenure, as their ability is still unknown by the market and investors (Fama, 1980; Holmstrom, 1982; Hermalin and Weisbach, 1998). Firm performance and investment decisions becomes critical to convey information about CEO ability to the board and the market (Dikolli, Mayew, and Nanda 2014). The market updates its perception on the CEO's managerial ability based on investment decisions they make (Prendergast and Stole 1996). I argue that in the early years of a CEO's tenure, the career concerns are likely to cause the CEO to distort investment decision making process, leading to investment inefficiency consequences.

On the one hand, CEOs can be motivated to prove their abilities and take on more investments early in their tenure. Prendergast and Stole (1996) state that new CEOs are likely to distort the project information conveyed to the board by exaggerating their own opinions to show they discover investment ideas of their own. Coles et al. (2006) show that compared to shorter-tenured CEOs, CEOs with longer tenure pursue more stable investment strategy in R&D. These prior studies imply that CEOs can act aggressively in investments in the early years of their tenure so that the market can recognize their abilities quickly, because risk-taking and making investment would signal to the market that a manager is talented. In other words, under the pressure of informing the market about their abilities, CEOs in early tenure have incentives to overinvest. Nevertheless, they may not be able to succeed in pursuing overinvestment due to the monitoring

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

from the board. Compared to that of longer-serving CEOs, the ability of shorter-tenure CEOs is more uncertain, creating a higher demand for monitoring from the board (Hermalin and Weisbach 1998). Consistent with this view, Dikolli, Mayew, and Nanda (2014) shows that the CEO-turnover sensitivity to firm performance declines over a CEO's tenure, which suggests stronger monitoring in early years than late years of CEO tenure. Furthermore, Song and Thakor (2006) demonstrate that both the CEO and the board have career concerns that interact, and such interaction affects the information sharing between the board and the CEO. Consequently, the project ideas and project information generated and provided by CEOs, especially those in their early tenure, are expected to be screened and seriously evaluated by the board of directors. Facing more intense monitoring, CEOs in early tenure might not be able to make aggressive investment even though their career concerns motivate them to do so.

On the other hand, new CEOs can be conservative and reluctant to make investment decisions, because they are less familiar with a new firm's operating environment, or they have been promoted to a position that demands different skills and information than the prior position. As it is critical in the early years to establish their reputations and favorably influence the market's perception of their abilities (e.g., Fama, 1980; Hermalin and Weisbach, 1998), they are likely to act in a prudent manner when allocating resources and making investment decisions (Holmstrom, 1982; Cadman et al., 2016). Hirshleifer and Thakor (1992) argue that career concerns may incentivize managers to favor safe projects in an attempt to delay the resolution of the uncertainty about their ability. In a similar vein, Holmstrom (1999) states that managers underinvest relative to the optimal level, because risky investment may reveal their true ability, which may compromise their future compensations. A more recent study, Chen and Zhang (2014), show that as a CEO's tenure gets longer, he/she becomes more risk-taking. With a risk-averse tendency during early

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

years of tenure, CEOs can withhold project information and bypass investment opportunities that match firm-specific characteristics and fit the firms' strategies, or exhibit herding behavior by ignoring their own private information about payoffs and copying the decisions of previous managers or other firms in the same industry (Scharfstein and Stein, 1990). Such practices are detrimental to corporate investment efficiency and lead to underinvestment. Furthermore, with the uncertainty about the ability of a new CEO and whether his or her skills will fit the firm's characteristics and eventually benefit its future operations during the first few years of tenure, the market may respond by rationing capital and reducing capital supply, which constrains financial resources and leads to ex post underinvestment if the firm needs to raise funds to finance an existing positive net present value project (Myers and Majluf, 1984).

Summing up the above discussion, I form the following hypothesis.

*Hypothesis:* There is investment inefficiency during the early years of CEO tenure.

### **3. Research design**

#### ***3.1 Sample and data***

The sample period of this study is from 1992 to 2016. I collect firms' financial data from the Compustat database and CEO characteristics from the Execucomp database. Corporate governance data are from the RiskMetrics database. I delete observations with missing values in the required variables and exclude firms in the financial services industries (with SIC codes between 6000 and 6999), which leaves a final sample of 21,012 firm-year observations.

#### ***3.2 Empirical model***

The hypothesis predicts that underinvestment exists during the early years of a CEO's tenure. Following Biddle et al. (2009), I estimate the following Model (1) to test the association between the early years of CEO tenure and investment efficiency. I employ a lagged model because

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

firms generally prepare investment budgets ahead of a new fiscal year. I control for both industry and year fixed effects to account for unobserved heterogeneity across industries and years in Model

(1). Standard errors are clustered at the firm level.

$$\begin{aligned} \text{INVT\_TOT}_{i,t+1} = & \beta_0 + \beta_1 \text{EARLY\_YEARS}_{i,t} + \beta_2 \text{EARLY\_YEARS}_{i,t} * \text{OVERI}_{i,t} + \beta_3 \text{OVERI}_{i,t} + \beta_4 \\ & \text{SIZE}_{i,t} + \beta_5 \text{MTOB}_{i,t} + \beta_6 \text{LOSS}_{i,t} + \beta_7 \text{SALE\_VOL}_{i,t} + \beta_8 \text{INVT\_VOL}_{i,t} + \beta_9 \text{CFO\_SALE}_{i,t} + \beta_{10} \\ & \text{CFO\_VOL}_{i,t} + \beta_{11} \text{SLACK}_{i,t} + \beta_{12} \text{DIV}_{i,t} + \beta_{13} \text{ZSCORE}_{i,t} + \beta_{14} \text{TANGIBILITY}_{i,t} + \beta_{15} \\ & \text{IND\_STRUCTURE}_{i,t} + \beta_{16} \text{AQ}_{i,t} + \beta_{17} \text{EINDEX}_{i,t} + \beta_{18} \text{CEOAGE}_{i,t} + e_{i,t+1}, \end{aligned} \quad (1)$$

where

INVT\_TOT = the level of total investments, equal to the sum of capital expenditures, R&D, and acquisition expenditures less cash receipts from the sale of property, plant, and equipment (PPE) scaled by lagged total assets, multiplied by 100;

EARLY\_YEARS = one if it is one of the first two years of a CEO's service at a firm, and zero otherwise;

OVERI = a composite score measure created to indicate the likelihood of over- and under-investment based on the ranking of cash and leverage levels;

SIZE = natural log of total assets;

MTOB = the ratio of the market value of total assets to book value of total assets;

LOSS = an indicator variable equal to one if net income before extraordinary items is negative, and zero otherwise;

SALE\_VOL = standard deviation of sales, scaled by average total assets over the previous five years;

INVT\_VOL = the standard deviation of total investments over the previous five years;

CFO\_SALE = operating cash flows divided by sales;

CFO\_VOL = standard deviation of the cash flow from operations, scaled by the average total assets over the previous five years;

SLACK = the ratio of cash to PPE;

DIV = an indicator variable equal to one if the firm paid dividends, and zero otherwise;

ZSCORE =  $0.033 * \text{earnings before extraordinary items} / \text{total assets} + \text{sales} / \text{total assets} + 0.014 * \text{retained earnings} / \text{total assets} + 0.012 * (\text{working capital} / \text{total assets}) + 0.006 * (\text{market value of common stock} / \text{total liabilities})$ ;

TANGIBILITY = PPE divided by total assets;

IND\_KSTRUCTURE = the mean of capital structure, long-term debt divided by the sum of long-term debt and the market value of equity, for firms in the same SIC 3-digit industry;

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

AQ = standard deviations (volatilities) of abnormal discretionary accruals times negative one; the abnormal discretionary accruals were estimated using the modified Jones model;

EINDEX = the entrenchment index constructed according to Bebchuk et al. (2009); and

CEOAGE = the age of the CEO.

Following Biddle et al. (2009), the model scheme relies on the underlying theory that the level of free cash flow and leverage together indicate the severity of agency problems, which may lead to overinvestment or underinvestment (Jensen, 1986; Myers and Majluf, 1984). Specifically, I construct a rank variable, OVERI, to indicate a firm's tendency towards overinvestment or underinvestment. Firms are ranked into deciles according to their cash and leverage levels; leverage is multiplied by -1 before ranking, so that it can be interpreted in the same direction as cash balance. Deciles constructed in this way are re-scaled to range from 0 to 1; a composite score measure (OVERI) is then constructed equaling the mean of the ranked values of the two partitioning variables. The OVERI variable is decreasing with the trend of underinvestment. In Model (1),  $\beta_1$  indicates investment levels during the early years of a CEO's tenure when underinvestment is most likely, i.e., when OVERI is 0. If underinvestment is more severe and significant during CEOs' early years of service than during later years, I expect to observe a negative  $\beta_1$ .

The variable of interest is EARLY\_YEARS, which equals one if the year is the first or second year of a CEO's tenure with a firm, and zero otherwise.

Following Biddle et al. (2009), Cheng et al. (2013), and Garcia Lara et al. (2016), I include a series of control variables in the model, such as firm size (SIZE), market-to-book ratio (MTOB), loss (LOSS), sales volatility (SALE\_VOL), investment volatility (INVT\_VOL), cash flow to sales ratio (CFO\_SALE), cash flow volatility (CFO\_VOL), cash to PPE ratio (SLACK), dividend (DIV), the possibility of bankruptcy measured as in Altman (1968) (ZSCORE), the ratio of PPE

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

to total assets (TANGIBILITY), and the industry mean of capital structure (IND\_STRUCTURE). Sales volatility and loss indicate firm performance and profitability; firm size and market-to-book ratio represent growth opportunities; cash flow to sales ratio, cash flow volatility, and cash to PPE ratio suggest free cash availability; dividends and the possibility of bankruptcy suggest the degree of financial constraint. In addition, I control for accruals quality (AQ) and the degree of management entrenchment (EINDEX), because Biddle et al. (2009) reveal that financial reporting quality and corporate governance can affect investment efficiency. Finally, I control for CEOs' age (CEOAGE), as age can be related to a CEO's risk-taking perspective, which in turns affects investment decision-making.

### 4. Results

#### *4.1 Descriptive statistics*

Table 1 reports descriptive statistics and correlations among variables. All continuous variables are winsorized at the 1st and 99th percentiles in each year to minimize the effects of outliers.

[Insert Table 1 about here]

In Panel A of Table 1, the mean (median) of total investments, INVT\_TOT, is 12.338 percent (4.996 percent) of the previous year's total assets. The mean of EARLY\_YEARS is 0.294, indicating that about 29.4 percent of the firm-year observations are from the first two years of a CEO's tenure. The average OVERI is 0.547. The average firm size is 7.696, and the market-to-book ratio has a mean of 1.955. The sample has an average sales volatility of 0.138 and a mean operating cash flow volatility of 0.044. 14.6 percent of the firm-year observations report losses. The average volatility of total investments is 0.044. The ratio of operating cash flow to sales has a mean of 0.129 and a median of 0.061. The ratio of cash to PPE, SLACK, has a mean of 1.312, and

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

the Z-score to indicate bankruptcy risk has an average of 1.122. Finally, the ratio of PPE to total assets, TANGIBILITY, has a mean of 0.313, the average negative standard deviation of abnormal accruals (AQ) is -1.379, and EINDEX has a mean of 2.977 and a median of 2.000.

In Panel B of Table 1, investment level is negatively related to early years of CEO tenure, which is consistent with the findings in Pan et al. (2016). In addition, OVERI, market-to-book ratio, investment volatilities, cash flow volatilities, and cash flow to sales ratio are positively related to investment levels, while firm size, loss, dividend distribution, likelihood of bankruptcy proxied by ZSCORE, capital structure, volatility of abnormal discretionary accruals, entrenchment index, and CEO age are negatively associated with investment levels.

### ***4.2 The association between the early years of CEO tenure and investment efficiency***

The main hypothesis predicts that during the early years of CEO tenure, underinvestment will be more severe and significant. The results of testing this hypothesis with Model (1) are reported in Column (1) of Table 2.

[Insert Table 2 about here]

As Column (1) of Table 2 shows, EARLY\_YEARS is significantly and negatively associated with the levels of total investments ( $t = -2.42$ ,  $p < 0.05$ ). This suggests that underinvestment is more likely to happen in the early years in of a CEO's tenure than in the later years. This effect is economically significant: Compared to non-early years (when EARLY\_YEARS equals zero), early years (when EARLY\_YEARS equals one) are associated with a decrease of 1.066 in total investments when firms are prone to underinvest. Because the mean value of total capital investments (deflated by the previous year's total assets) is 12.338, this reflects a decrease of 8.4 percent. I do not find that CEOs tend to overinvest during their early years of service: The coefficient estimate for the interaction between EARLY\_YEARS and



OVERI is insignificant. Overall, the evidence shows that CEOs tend to underinvest in the early years of their tenure, which supports the hypothesis that investment inefficiency during the early years of CEOs' tenure. In the next section, I examine whether the investment inefficiency becomes more or less pronounced in certain contexts by conducting cross-sectional analyses.

### ***4.3 Cross-sectional analyses of the association between the early years of CEO tenure and investment inefficiency***

I conduct a series of cross-sectional analyses to investigate whether the association between the early years of CEO tenure and investment inefficiency is stronger or weaker when 1) the CEO is externally appointed versus internally promoted, 2) the CEO holds a permanent position versus an interim position, 3) the CEO has higher- versus lower-than-average managerial abilities, and 4) the information asymmetry at the firm level is high versus low.

Externally appointed CEOs face a greater risk of termination; therefore, they have higher career concerns (Gillan et al., 2009). Furthermore, externally appointed CEOs are more likely than internally appointed CEOs to lack firm-specific and even industry-specific knowledge, especially during their early years with the firm (Harris and Helfat, 1997). As a result, externally appointed CEOs typically require greater monitoring diligence from the board (Huson et al., 2001; Hermalin, 2005; Jongjaroenkamol and Laux, 2017). I identify a CEO as internally promoted if he or she was in the top management team for two years before becoming the CEO, and externally hired otherwise. In order to test whether the association between the early years of CEO tenure and underinvestment differs between externally hired and internally promoted CEOs, I create two dummy variables, `EARLY_EXTERNAL` and `EARLY_INTERNAL`. `EARLY_EXTERNAL` equals one if the observation is from one of the early years of a CEO's tenure and the CEO is externally appointed, and zero otherwise; `EARLY_INTERNAL` equals one if the observation is

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

from one of the early years of a CEO's tenure and the CEO is internally promoted, and zero otherwise. I add these two dummy variables and their respective interactions with OVERI in Model (1) and report the results of testing this modified Model (1) in Column (2) of Table 2.

Focusing on Column (2) of Table 2, I find a significant and negative efficiency for EARLY\_EXTERNAL ( $t = -2.28$ ,  $p < 0.05$ ), while the coefficient estimate for EARLY\_INTERNAL is not significant. This evidence suggests that externally hired CEOs are more likely than internally promoted CEOs to underinvest during their early years of service. In addition, I find a positive and significant coefficient for EARLY\_EXTERNAL\*OVERI, which indicates a significant incremental increase in investment levels during the early years of an externally hired CEO's tenure as overinvestment becomes more likely. A joint significance test for EARLY\_EXTERNAL+EARLY\_EXTERNAL\*OVERI does not yield significant results (untabulated), suggesting that there is no significant evidence for overinvestment during the early years of externally appointed CEOs' tenure.

Next, I investigate whether the CEO occupies a permanent or an interim position matters in the magnitude of investment inefficiency during the first few years. Permanent CEOs and interim CEOs can display different patterns of investment decision-making in their early years of service because these two groups have varying incentives and performance (e.g., Ballinger and Marcel, 2010; Chen et al., 2015). For example, Ballinger and Marcel (2010) show that interim CEOs are associated with lower performance during the period in which the interim serves. Chen et al. (2015) find that interim CEOs are more likely than permanent CEOs to engage in earnings management to increase firm earnings in order to improve their promotion prospects. Due to the temporary nature of their position, interim CEOs are likely to underinvest; however, if they have incentives to become a permanent CEO, they can be motivated to make aggressive investment

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

decisions to signal their ability and force the market to rely more on the prior estimate of their ability (Hermalin 1993). I utilize the Director and Officer Changes dataset in the AuditAnalytics database to identify whether a CEO succession type is interim or permanent when a turnover event occurs. In a procedure similar to the one described above, I create two dummy variables: `EARLY_PERMANENT` and `EARLY_INTERIM`. `EARLY_PERMANENT` equals one if the observation is from one of the early years of a CEO's tenure and the CEO is appointed or promoted as a permanent CEO, and zero otherwise; `EARLY_INTERIM` equals one if the observation is from one of the early years of a CEO's tenure and the CEO occupies an interim position, and zero otherwise. I add these two dummy variables and their respective interactions with `OVERI` to Model (1) and report the results of testing this modified Model (1) in Column (3) of Table 2. The results show that interim CEOs exhibit pronounced underinvestment during their early years of service (i.e., the coefficient for `EARLY_INTERIM` is significant and negative), but permanent CEOs do not.

Next, I examine whether CEOs with varying levels of managerial ability display different investment efficiency in their early years of tenure. Higher-ability CEOs have better knowledge and judgment than their peers and are better able anticipate future changes (Trueman, 1986). They generate more precise estimates of underlying profitability of the projects and respond to the economic environment more quickly than their less able counterparts (Prendergast and Stole 1996). More importantly, more able CEOs are more confident about their own opinion and the project information they collect and share with the board (Prendergast and Stole 1996). In contrast, less able CEOs may ignore their own private information about payoffs and copy the decisions of previous managers because of their greater career and reputation concerns, which leads to investment inefficiency (Scharfstein and Stein, 1990). Consistent with this conjecture, Jian and

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

Lee (2011) provide empirical evidence that investment decisions made by more reputable CEOs lead to better post-investment performance. Gan (2019) shows that more able CEOs make more efficient investment decisions. I adopt the managerial ability measures developed by Demerjian et al. (2012) and divide the sample into an above-median group (HIGHABILITY) and a below-median group (LOWABILITY). I then create two dummy variables, EARLY\_HIGHABILITY and EARLY\_LOWABILITY, and add these two dummy variables and their respective interactions with OVERI to Model (1). The results are reported in Column (4) of Table 2. They show that the low-ability CEOs, but not the high-ability CEOs, tend to underinvest during their early years of tenure ( $t = -2.32, p < 0.05$ ).

Finally, I investigate how the information environment of the firm affects the propensity of investment inefficiency during the early years of CEO tenure. Prior studies (e.g., Bushman and Smith, 2001; Healy and Palepu, 2001; Biddle and Hilary, 2006; Lambert et al., 2007; Biddle et al., 2009) substantiate that high financial reporting quality can improve investment efficiency by reducing information asymmetry between firms and external suppliers of capital and by enhancing monitoring effectiveness. Garcia Lara et al. (2016) find that the effects of accounting on mitigating firms' underinvestment are more pronounced in firms characterized by greater information asymmetry. This line of literature suggests that the investment inefficiency phenomenon during the early years of CEO tenure can be exaggerated by a high level of information asymmetry in the firm. I use three variables to capture firms' information environment: 1) information quality, measured as the standard deviation of abnormal discretionary accruals (estimated using the modified Jones model) over the past five years; 2) information asymmetry, computed as the average of the standardized values of the bid-ask spread, volatility, and idiosyncratic risk; and 3) credit rating, an indicator variable that equals one if the firm does not have a credit rating in

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

Compustat, and zero otherwise. I then create dummy variables to indicate early years and high/low information quality (EARLY\_YEARS\_HIGHAQ/EARLY\_YEARS\_LOWAQ), early years and high/low information asymmetry (EARLY\_YEARS\_HIGHIA/EARLY\_YEARS\_LOWIA), and early years and credit rating/no credit rating (EARLY\_YEARS\_CR/EARLY\_YEARS\_NCR). I incorporate these variables and their respective interactions with OVERI into Model (1). The results are tabulated in Table 3.

[Insert Table 3 about here]

Column (1) of Table 3 shows a marginally significant coefficient ( $t = -1.79$ ,  $p < 0.1$ ) for EARLY\_YEARS\_LOWAQ, suggesting that the association between underinvestment and early years of CEO tenure is pronounced for firms with low information quality. Column (2) reveals that an environment with high information asymmetry exacerbates underinvestment during CEOs' early years of tenure (the coefficient for EARLY\_YEARS\_HIGHIA is significant and negative at  $p < 0.01$ ). Finally, Column (3) reports that underinvestment in CEOs' early years is most evident for firms without a credit rating ( $t = -2.53$ ,  $p < 0.05$ ). Taken together, the results in Table 3 show that the investment inefficiency problem, i.e., underinvestment, during the early years of CEO tenure is most pronounced in firms that have low information quality and high information asymmetry.

### 5. Additional analyses

As discussed earlier, when a CEO is newly promoted or appointed, there is high uncertainty about the new CEO's ability (Fama, 1980; Holmstrom, 1982; Hermalin and Weisbach, 1998) and whether his or her skills will fit the firm's characteristics and eventually benefit its future operations (Bills et al., 2017). The market can respond to such uncertainty by reducing capital supply, which constrains financial resources and leads to ex post underinvestment if the firm needs

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

to raise funds to finance an existing positive net present value project (Myers and Majluf 1984). If this is the case, a decrease in debt and equity issuance is expected during the early years of CEO tenure. Two variables, FUTURE\_DEBT\_ISSUANCE and FUTURE\_EQUITY\_ISSUANCE, are constructed to indicate whether firms issue debt and equity. Specifically, FUTURE\_DEBT\_ISSUANCE is debt issuance in year  $t+1$ , where debt issuance equals long-term debt issuance minus long-term debt reduction plus current debt changes; FUTURE\_EQUITY\_ISSUANCE is equity issuance in year  $t+1$ , where equity issuance equals sale of common and preferred stock minus purchase of common and preferred stock. Both debt issuance and equity issuance are scaled by sales. I then replace the dependent variable in Model (1) with these two variables. In addition to the existing control variables in Model (1), I also control for credit rating and information asymmetry, computed as the average of the standardized values of the bid-ask spread, volatility, and idiosyncratic risk, to account for the potential effects of information environment on firms' likelihood of issuing debt and/or equity (Garcia Lara et al. 2016). In addition to investigating the debt and equity issuance patterns during the early years of CEO tenure, I also look at specific contexts including externally appointed versus internally promoted CEOs, permanent versus interim CEOs, and high-ability versus low-ability CEOs. The results are tabulated in Table 4.

[Insert Table 4 about here]

Columns (1) and (2) of Panel A in Table 4 report the results of testing Model (1). They show that overall, the early years of CEO tenure are associated with less debt issuance ( $t = -2.46$ ,  $p < 0.05$ ) but not less equity issuance. Columns (3) and (4) look at externally hired versus internally promoted CEOs and show that externally hired, but not internally promoted, CEOs issue less debt during their early years ( $t = -2.51$ ,  $p < 0.05$ ); no significant evidence is found for equity issuance.

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

Columns (1) and (2) of Panel B in Table 4 reveal that the early years of interim CEOs are associated with less debt issuance ( $t = -1.95$ ,  $p < 0.1$ ); no significant evidence is found for equity issuance. Finally, Column (3) of Panel B in Table 4 shows that the early years of low-ability CEOs' tenure display less debt issuance ( $t = -1.92$ ,  $p < 0.1$ ). In addition, Column (4) shows that high-ability CEOs tend to issue more equity during their early years ( $t = 2.49$ ,  $p < 0.05$ ) when the firm is prone to underinvest; as firms' likelihood of overinvestment increases, CEOs' early years are associated with decreased issuance of equity ( $t = -3.09$ ,  $p < 0.01$ ).

### 6. Robustness tests

I conduct a battery of robustness tests to provide additional support for the main findings. First, I adopt alternative measures of the independent variable of interest by defining the first three years of a CEO's tenure in a firm as the early years and find consistent results (not tabulated). Second, I conduct the analyses based on specific types of investments (e.g., capital expenditures and non-capital expenditures that include R&D and acquisition expenditures), and I find that CEOs tend to significantly underinvest in both capital expenditures ( $t = -2.67$ ,  $p < 0.01$ ) and non-capital expenditures ( $t = -1.77$ ,  $p < 0.1$ ). The results are reported in Panel A of Table 5.

[Insert Table 5 about here]

Third, I employ two alternative OVERI measures, OVERINDUSTRY and OVERAGGREGATE as in Biddle et al. (2009), to conduct sensitivity analyses. Following Biddle et al. (2009), I aggregate investment at the industry and economy levels and use these measures to proxy for firms' likelihood of over- and underinvestment. To construct OVERINDUSTRY, I estimate an investment model at the industry level by regressing average investment and average sales growth for all industries with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification for each year. I then rank the residuals from these

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

estimations into deciles (re-scaled from zero to one) and construct the aggregate industry-year variable, *OVERINDUSTRY*, to indicate the tendency to over- and underinvest. Similarly, I regress average investment and average sales growth in the overall economy in each of the sample years and rank the residuals into deciles (re-scaled from zero to one) to construct the aggregate economy-year variable, *OVERAGGREGATE*. I then replace the *OVERI* variable in Model (1) with the two variables and re-test the main model. Results are tabulated in Panel B of Table 5. I consistently find significant underinvestment during the early years of a CEO's service using the industry-year aggregated measure, *OVERINDUSTRY*, and the economy-year aggregated measure, *OVERAGGREGATE*, with a significant and negative coefficient ( $t = -1.99$ ,  $p < 0.05$ ) for *EARLY\_YEARS* in Column (1) and a marginally significant and negative coefficient ( $t = -1.80$ ,  $p < 0.1$ ) for *EARLY\_YEARS* in Column (2).

Finally, as prior studies find that CEOs in their last years have incentives to reduce discretionary expenditures, such as R&D and advertising, to boost accounting earnings and bonuses (e.g., Dechow and Sloan, 1991; Murphy and Zimmerman, 1993; Cheng, 2004; Kalyta, 2009), I control for a variable indicating the last two years of a CEO's service in Model (1). The results, which are tabulated in Panel C of Table 5, show that CEOs underinvest during their early years of service. They also show that CEOs tend to underinvest during their last years of service, consistent with the findings in prior studies.

## 7. Conclusions

Existing studies, such as Bertrand and Schoar (2003) and Fee et al. (2013), substantiate that manager fixed effects and managerial attributes significantly explain firms' variations in investment practices and policies. Meanwhile, Biddle and Hilary (2006), Biddle et al. (2009), and Garcia Lara et al. (2016) show that the information environment has nontrivial impacts on firms'



## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

investment efficiency. In this study, I examine firms' investment efficiency during the early years of a CEO's tenure, when the management information environment can be significantly changed, and the new CEO's risk appetite, personal incentives, and career concerns are gradually emerging and affecting his or her investment decisions following the CEO turnover event. Using data from 1992 to 2016, I find that underinvestment is more likely during the early years (i.e., the first two years) than during the other years of a CEO's tenure. I find no evidence for overinvestment during the early years of a CEO's tenure.

I further show that the propensity to underinvest varies with the degree of the new CEO's career concerns and the information asymmetry and information quality of the firm's environment. Specifically, I find that underinvestment is most evident during the early years of the tenure of externally hired CEOs, of interim CEOs, and of low-ability CEOs. I also find that underinvestment during the early years of CEO tenure is most pronounced in firms that have high information asymmetry and low financial information quality. This body of evidence suggests that the new CEO's career concerns in the early years of a CEO's tenure are the underlying factors that contribute to the underinvestment phenomenon, and increased information asymmetry at firm level can intensify this issue.

This study extends the literature on myopic managerial behavior following CEO turnovers (e.g., Strong and Meyer, 1987; Elliott and Shaw, 1988; DeAngelo, 1988; Pourciau, 1993; Ali and Zhang, 2015). It does so by documenting evidence of the prevalence of underinvestment during the early years of a CEO's tenure, and showing that the degree of investment inefficiency depends on the type of succession, the CEO's ability, and the degree of the firm's information asymmetry. These findings also contribute to the research stream on how managerial attributes can influence firms' investment practices (e.g., Bertrand and Schoar, 2003; Fee et al., 2013; Denis and Denis,

1995). Finally, this study has significant implications for the firm's monitoring body, the board of directors and shareholders. Once they are aware of the underinvestment phenomenon, they might choose to provide special attention, stronger monitoring, and increased levels of support. By considering succession type, CEO characteristics, and the nature of the firm's information environment, they will be better positioned to help the CEO enhance the firm's growth, competitiveness, and long-term value.

## References

- Abel, A. (1983). Optimal investment under uncertainty. *American Economic Review* 73, 228–233.
- Ali, A., & Zhang, W. (2015). CEO tenure and earnings management. *Journal of Accounting and Economics* 59, 60–79.
- Biddle, G., & Hilary G. (2006). Accounting quality and firm-level capital investment *The Accounting Review* 81, 963-982.
- Biddle, G., Hilary, G., & Verdi, R. (2009). How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48, 112-131.
- Bills, K. L., Lisic, L. L., & Seidel, T. A. (2017). Do CEO Succession and Succession Planning Affect Stakeholders' Perceptions of Financial Reporting Risk? Evidence from Audit Fees. *The Accounting Review* 92 (4), 27-52.
- Bushman, R., & Smith, A. (2001). Financial accounting information and corporate governance. *Journal of Accounting and Economics* 31, 237–333.
- Cadman, B. D., Campbell, J. L., & Klasa, S. (2016). Are Ex Ante CEO Severance Pay Contracts Consistent with Efficient Contracting? *Journal of financial and Quantitative Analysis* 51 (3), 737–769.
- Cheng, S. (2004). R&D expenditure and CEO compensation. *Accounting Review* 79, 305–328.
- Cheng, M., Dhaliwal, D., & Zhang, Y. (2013). Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting? *Journal of Accounting and Economics* 56 (1), 1-18.
- Chen, D., & Zheng, Y. (2014). CEO tenure and risk-taking. *Global Business and Finance Review* 19, 1-27.
- Coles, J. L., Daniel, N. D., & Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of financial economics* 79, 431-468.
- DeAngelo, L. (1988). Managerial competition, information costs and corporate governance: the use of accounting performance measures in proxy contests. *Journal of Accounting and Economics* 10, 3–36.

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

- Dechow, P. M., & Sloan, R. (1991). Executive incentives and the horizon problem: an empirical investigation. *Journal of Accounting and Economics* 14, 51–89.
- Du, C., & Lin, T. (2011). CEO turnover, equity-based compensation and firms investment decisions. *Journal of Business and Economics Research* 9 (8), 19-40.
- Elliott, J., & Shaw, W. (1988). Write-Offs as accounting procedures to manage perceptions. *Journal of Accounting Research* 26 (Suppl.), 91–119.
- Fama, E. F. (1980). Agency problems and the theory of the firm. *Journal of Political Economy* 88, 288–307.
- Gan, H. (2019). Does CEO managerial ability matter? Evidence from corporate investment efficiency. *Review of Quantitative Finance and Accounting* 52(4), 1085-1118.
- Gibbons, R., & Murphy, K. J. (1992). Optimal incentive contracts in the presence of career concerns: theory and evidence. *Journal of Political Economy* 100, 468–505.
- Gillan, S. L., Hartzell, J. C., & Parrino, R. (2009). Explicit versus implicit contracts: Evidence from CEO employment agreements. *Journal of Finance* 64 (4) 1629–1655.
- Garcia Lara, J. M., Garcia Osma, B. & Penalva, F. (2016). Accounting Conservatism and firm investment efficiency. *Journal of Accounting and Economics* 61, 221-238.
- Harris, D., & Helfat, C. (1997). Specificity of CEO human capital and compensation. *Strategic Management Journal*, 18 (11), 895–920.
- Hermalin, B. E. (1993). Managerial preferences concerning risky projects. *Journal of Law, Economics, and Organization*, 9(1), 127-135.
- Hermalin, B., & Weisbach, M. (1998). Endogenously chosen boards of directors and their monitoring of the CEO. *American Economic Review* 88, 96–118.
- Hermalin, B. E. (2005). Trends in corporate governance. *Journal of Finance* 60 (5), 2351–2384.
- Healy, P., & Palepu, K. (2001). Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics* 31, 405–440.
- Hirshleifer, D., & Thakor, A. V. (1992). Managerial conservatism, project choice, and debt. *Review of Financial Studies*, 5(3), 437-470.
- Holmstrom, B. (1982). Moral hazard in teams. *Bell Journal of Economics* 13, 324–340.
- Holmstrom, B. (1999). Managerial incentive problems: a dynamic perspective. *Review of Economic Studies*, 66(1), 169-182.
- Huson, M., Parrino, R. & Starks L. (2001). Internal monitoring mechanisms and CEO turnover: A long term perspective. *Journal of Finance*, 56 (6), 2265–2297.
- Jian, M., & Lee, K. W. (2011). Does CEO reputation matter for capital investments. *Journal of Corporate Finance* 17, 929-946.
- Kalyta, P. (2009). Accounting discretion, horizon problem, and CEO retirement benefits. *Accounting Review* 84, 1553–1573.

## INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

- Lambert, R., Leuz, C., & Verrecchia, R. (2007). Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45, 385–420.
- Myers, S., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.
- Murphy, K. J., & Zimmerman, J. L. (1993). Financial performance surrounding CEO turnover. *Journal of Accounting and Economics* 16, 273–315.
- Pan, Y., Wang, T. Y., & Weisbach, M. S. (2016). CEO investment cycles. *Review of Financial Studies* 29, 2955–2999.
- Pae, S., Song, C. J., & Yi, A. C. (2016). Career concerns and management earnings guidance. *Contemporary Accounting Research* 33, 1172-1198.
- Prendergast, C., & Stole, L. (1996). Impetuous youngsters and jaded old-timers: acquiring a reputation for learning. *Journal of Political Economy* 104 (6), 1105-1134.
- Strong, J., & Meyer, J. (1987). Asset write downs: managerial incentives and security returns. *Journal of Finance* 42, 643–661.
- Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *American Economic Review* 80, 465-479.
- Song, F., & Thakor, A. V. (2006). Information control, career concerns, and corporate governance. *Journal of Finance* 61, 1845-1896.
- Weisbach, M. S. (1995). CEO turnover and the firm's investment decisions. *Journal of Financial Economics* 37 (2), 159-188.
- Xie, J. (2015). CEO career concerns and investment efficiency: Evidence from China. *Emerging Markets Review* 24, 149–159
- Yoshikawa, H. (1980). On the “q” theory of investment. *American Economic Review* 70, 739–743.
- Trueman, B. (1986). Why do managers voluntarily release earnings forecasts? *Journal of Accounting and Economics* 8, 53-71.

**Appendix A**  
**Variable Definitions**

<b>Variables</b>	<b>Definitions</b>
AQ	Standard deviations of abnormal discretionary accruals estimated by the modified Jones Model, multiplied by negative 1
CAPX	The level of capital expenditures scaled by lagged total assets, multiplied by 100
CFO_SALE	Operating cash flows divided by sales
CFO_VOL	Standard deviation of the cash flow from operations deflated by average total assets over previous 5 years
CEOAGE	The age of CEO
CR	Take the value of 1 if the firm has crediting rating in Compustat, and 0 otherwise
DIV	A dummy variable equal to 1 if the firm paid dividends, and 0 otherwise
EINDEX	The entrenchment index constructed according to Bebchuk <i>et al.</i> (2009).
EARLY_YEARS	The first or second year of a CEO's tenure
EXTERNAL	Take the value of 1 if the CEO is hired from outside, and 0 otherwise
HIGHAQ	Take the value of 1 if the firm's accounting quality (AQ) is above median, and 0 otherwise
HIGHABILITY	Take the value of 1 if the CEO's ability score as measured in Dermerjian et al. (2012) is above median, and 0 otherwise
HIGHIA	Take the value of 1 if the firm's information asymmetry (IA) is above median, and 0 otherwise
IA	Information asymmetry, measured as the average of the standardized values of the bid–ask spread, volatility, and idiosyncratic risk following Garcia Lara et al. (2016)
INVT_TOT	The level of total investment, measured as the capital expenditures + R&D + acquisition expenditures - cash receipts from sale of property, plant, and equipment, scaled by lagged total assets, multiplied by 100
INVT_VOL	The standard deviation of total investments over previous five years

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

INTERNAL	Take the value of 1 if the CEO is promoted internally and 0 otherwise
INTERIM	Take the value of 1 if the CEO is an interim CEO, and 0 otherwise
IND_STRUCTURE	Mean of K-structure, measured as long-term debt divided by the sum of long-term debt and the market value of equity, for firms in the same SIC3-digit industry
LOSS	A dummy variable equal to 1 if net income before extraordinary items is negative, and 0 otherwise;
LOWAQ	Take the value of 1 if the firm's accounting quality (AQ) is below median, and 0 otherwise
LOWABILITY	Take the value of 1 if the CEO's ability score as measured in Dermerjian et al. (2012) is below median, and 0 otherwise
LOWIA	Take the value of 1 if the firm's information asymmetry (IA) is below median, and 0 otherwise
MTOB	The ratio of the market value of total assets to book value of total assets
NCR	Take the value of 1 if the firm has no crediting rating in Compustat, and 0 otherwise
NON_CAPX	The level of R&D expenditures and acquisition expenditures scaled by lagged total assets, multiplied by 100
OVERI	A composite score measure created to indicate the likelihood of over-investment and under-investment based on the ranking of cash and leverage levels
OVERINDUSTRY	Regress average investment on average sales growth for all industries with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification for each year, then rank the residuals from these estimations into deciles (re-scaled from zero to one) to indicate the tendency of over- and underinvestment
OVERAGGREGATE	Regress average investment and average sales growth in the overall economy in each of the sample years, then rank the residuals into deciles (re-scaled from zero to one) to indicate the tendency of over- and underinvestment
PERMANENT	Take the value of 1 if the CEO is a permanent CEO, and 0 otherwise
SALE_VOL	Standard deviation of the sales deflated by average total assets over previous 5 years
SIZE	Natural log of total assets
SLACK	The ratio of cash to PPE
TANGIBILITY	PPE divided by total assets
ZSCORE	$0.033 \times \text{earnings before extraordinary item} / \text{total assets} + \text{sales} / \text{total assets} + 0.014 \times \text{retained earnings} / \text{total assets} + 0.012 \times (\text{working capital} / \text{total assets}) + 0.006 \times (\text{market value of common stock} / \text{total liabilities})$

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 1**  
**Panel A: Descript Statistics**

Variable	N	Mean	SD	P10	P25	Median	P75	P90
INVT_TOT	21012	12.338	12.067	0.567	2.683	4.996	8.846	15.334
EARLY_YEARS	21012	0.294	0.456	0.000	0.000	0.000	0.000	1.000
OVERI	21012	0.547	0.245	0.150	0.250	0.350	0.500	0.750
SIZE	21012	7.696	1.490	4.834	5.832	6.590	7.566	8.675
MTOB	21012	1.955	1.189	0.813	1.049	1.223	1.579	2.237
LOSS	21012	0.146	0.353	0.000	0.000	0.000	0.000	0.000
SALE_VOL	21012	0.138	0.125	0.012	0.032	0.056	0.100	0.174
INVT_VOL	21012	0.059	0.057	0.003	0.010	0.020	0.040	0.077
CFO_SALE	21012	0.129	0.119	-0.134	0.022	0.061	0.109	0.180
CFO_VOL	21012	0.044	0.034	0.006	0.013	0.021	0.034	0.056
SLACK	21012	1.312	2.749	0.001	0.015	0.059	0.284	1.183
DIV	21012	0.639	0.480	0.000	0.000	0.000	1.000	1.000
ZSCORE	21012	1.122	0.700	0.213	0.394	0.631	0.971	1.414
TANGIBILITY	21012	0.313	0.233	0.023	0.063	0.125	0.243	0.463
IND_STRUCTURE	21012	0.190	0.128	0.004	0.064	0.087	0.154	0.265
AQ	21012	-1.379	4.778	-26.693	-2.571	-0.696	-0.151	-0.050
EINDEX	21012	2.977	1.489	0.000	1.000	2.000	3.000	4.000
CEOAGE	21012	56.103	7.194	40.000	47.000	51.000	56.000	61.000

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 1 (Continued)**

**Panel B: Correlation matrix**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.INVT_TOT	1																	
2.EARLY_YEAR	-0.0260*	1																
3.OVERI	0.2609*	-0.0287*	1															
4.SIZE	-0.1499*	0.0243*	-0.4076*	1														
5.MTOB	0.2722*	-0.0487*	0.3544*	-0.1007*	1													
6.LOSS	-0.0369*	0.0690*	0.0191*	-0.1329*	-0.1391*	1												
7.SALE_VOL	0.0055	0.0119*	0.1162*	-0.1957*	0.0176*	0.1027*	1											
8.INVT_VOL	0.1153*	-0.0355*	0.0371*	-0.1346*	0.0146*	0.1221*	0.1808*	1										
9.CFO_SALE	0.1588*	-0.0286*	0.0399*	0.2509*	0.1871*	-0.2396*	-0.2375*	0.0366*	1									
10.CFO_VOL	0.1465*	0.0091	0.3163*	-0.3561*	0.1745*	0.1790*	0.4239*	0.1771*	-0.1201*	1								
11.SLACK	0.1421*	-0.0154*	0.4777*	-0.2003*	0.2509*	0.0735*	0.1285*	0.0727*	0.0480*	0.2708*	1							
12.DIV	-0.1643*	0.0061	-0.3136*	0.3132*	-0.1047*	-0.1999*	-0.1750*	-0.2144*	0.0651*	-0.2955*	-0.2947*	1						
13.ZSCORE	-0.0714*	-0.0012	0.0346*	-0.2262*	0.0888*	-0.0962*	0.3613*	-0.1350*	-0.4033*	0.1233*	-0.1098*	0.0192*	1					
14.TANGIBILITY	-0.007	0.0133*	-0.4074*	0.2116*	-0.2213*	-0.0374*	-0.1809*	-0.1136*	0.2778*	-0.2178*	-0.4403*	0.2488*	-0.1808*	1				
15.IND_STRUCT	-0.2071*	0.0309*	-0.5587*	0.2878*	-0.3824*	0.0528*	-0.1165*	-0.0487*	0.0554*	-0.2264*	-0.3071*	0.2189*	-0.2020*	0.5107*	1			
16.NEG_STD_Df	-0.0239*	0.0045	-0.0410*	-0.0197*	-0.0268*	0.0178*	-0.0244*	-0.0092	-0.0031	-0.0167*	-0.0225*	-0.0128*	0.0298*	0.0938*	0.0900*	1		
17.EINDEX	-0.0255*	-0.0075	-0.0730*	0.0513*	-0.0886*	-0.0217*	-0.0762*	0.0104	0.0643*	-0.1065*	0.0222*	0.0207*	-0.0489*	-0.0520*	-0.0199*	-0.1838*	1	
18.CEOAGE	-0.0795*	-0.2495*	-0.0739*	0.0962*	-0.0746*	-0.0646*	-0.0812*	-0.0733*	0.0002	-0.1361*	-0.1149*	0.1581*	-0.0122*	0.0605*	0.0729*	-0.0013	-0.0057	1

\* indicates significance level at least <0.1



# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 2**  
**Early years of CEO tenure and investment efficiency**

	(1)	(2)	(3)	(4)
	INVT_TOT	INVT_TOT	INVT_TOT	INVT_TOT
EARLY_YEARS	-1.066** (-2.42)			
EARLY_YEARS*OVERI	0.997 (1.16)			
EARLY_EXTERNAL		-2.631** (-2.28)		
OVERI*EARLY_EXTERNAL		4.837** (2.40)		
EARLY_INTERNAL		-0.572 (-1.10)		
OVERI*EARLY_INTERNAL		-0.199 (-0.19)		
EARLY_PERMANENT			0.706 (0.77)	
OVERI*EARLY_PERMANENT			-0.868 (-0.49)	
EARLY_INTERIM			-1.380** (-2.44)	
OVERI*EARLY_INTERIM			0.876 (0.79)	
EARLY_HIGHABILITY				-0.022 (-0.03)
OVERI*EARLY_HIGHABILITY				1.029 (0.73)
EARLY_LOWABILITY				-1.515** (-2.32)
OVERI*EARLY_LOWABILITY				0.554 (0.47)
OVERI	4.588*** (6.27)	4.885*** (6.00)	4.365*** (4.31)	4.275*** (5.64)
SIZE	-0.587*** (-5.61)	-0.454*** (-3.80)	-0.744*** (-5.25)	-0.676*** (-6.08)
MTOB	1.722*** (11.65)	1.640*** (10.02)	1.391*** (6.59)	1.688*** (11.31)
LOSS	-1.735*** (-6.98)	-1.718*** (-6.23)	-1.647*** (-4.67)	-1.882*** (-7.40)

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 2 (Continued)**

	(1)	(2)	(3)	(4)
	INVT_TOT	INVT_TOT	INVT_TOT	INVT_TOT
SALE_VOL	-2.302** (-2.49)	-2.919*** (-2.74)	-0.110 (-0.09)	-2.669*** (-2.77)
INVT_VOL	14.788*** (7.90)	17.134*** (8.21)	14.048*** (5.53)	14.210*** (7.45)
CFO_SALE	4.895*** (2.75)	4.617** (2.16)	9.496*** (3.93)	5.277*** (2.94)
CFO_VOL	12.558*** (2.86)	15.055*** (3.04)	11.359* (1.78)	11.986*** (2.78)
SLACK	0.083 (1.33)	0.098 (1.18)	0.174* (1.77)	0.102 (1.59)
DIV	-1.970*** (-6.82)	-1.991*** (-5.99)	-1.689*** (-4.15)	-1.848*** (-6.51)
ZSCORE	0.210 (0.84)	0.278 (1.00)	0.225 (0.66)	0.133 (0.52)
TANGIBILITY	9.886*** (10.57)	10.758*** (9.78)	9.546*** (7.04)	9.919*** (10.44)
IND_STRUCTURE	-5.145*** (-4.34)	-5.497*** (-4.13)	-4.869*** (-3.09)	-4.976*** (-4.08)
AQ	-0.002 (-0.12)	-0.007 (-0.28)	-0.020 (-0.80)	-0.013 (-0.64)
EINDEX	0.257*** (2.72)	0.243** (2.33)	0.095 (0.74)	0.238** (2.37)
CEOAGE	-0.071*** (-4.84)	-0.066*** (-3.92)	-0.088*** (-4.32)	-0.076*** (-5.01)
CONSTANT	10.941*** (7.23)	9.268*** (5.35)	12.769*** (6.28)	12.772*** (8.09)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
N	21,012	16,026	12,255	18,911
Adjusted R-squared	0.207	0.216	0.209	0.204

All variables are defined in Appendix A. Standard errors are clustered at the firm levels. \*, \*\*, and \*\*\* indicate significance levels at 10%, 5%, and 1%, respectively.

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 3**  
**Analyses contingent on information environment**

	Information quality	Information asymmetry	Credit rating
	(1)	(2)	(3)
	INVT_TOT	INVT_TOT	INVT_TOT
EARLY_YEARS_HIGHAQ	-0.806 (-1.55)		
OVERI*EARLY_YEAR_HIGHAQ	0.245 (0.22)		
EARLY_YEARS_LOWAQ	-1.261* (-1.79)		
OVERI*EARLY_YEAR_LOWAQ	1.525 (1.24)		
EARLY_YEARS_HIGHIA		-1.679*** (-2.59)	
OVERI*EARLY_YEARS_HIGHIA		1.318 (1.14)	
EARLY_YEARS_LOWIA		-1.181 (-1.63)	
OVERI*EARLY_YEARS_LOWIA		2.382 (1.54)	
EARLY_YEARS_NCR			-1.424** (-2.53)
OVERI*EARLY_YEARS_NCR			1.393 (1.40)
EARLY_YEARS_CR			-0.577 (-0.91)
OVERI*EARLY_YEARS_CR			0.718 (0.48)
OVERI	4.608*** (6.29)	4.597*** (5.75)	4.551*** (6.22)
CONTROL VARIABLES	Included	Included	Included
CONSTANT	10.954*** (7.25)	11.595*** (6.75)	11.067*** (7.28)
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Observations	21,012	17,420	21,012
Adjusted R-squared	0.207	0.196	0.207

All variables are defined in Appendix A. Standard errors are clustered at the firm levels. \*, \*\*, and \*\*\* indicate significance levels at 10%, 5%, and 1%, respectively.

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 4**

**Early years of CEO tenure and future debt and equity issuance**

**Panel A**

	(1) Future_debt_ issuance	(2) Future_equity_ issuance	(3) Future_debt_ issuance	(4) Future_equity_ issuance
EARLY_YEARS	-0.016** (-2.46)	0.002 (0.57)		
EARLY_YEARS*OVERI	0.013 (1.10)	-0.008 (-1.15)		
EARLY_EXTERNAL			-0.050** (-2.51)	0.005 (0.44)
OVERI*EARLY_EXTERNAL			0.061** (1.98)	-0.008 (-0.39)
EARLY_INTERNAL			-0.009 (-1.19)	0.004 (0.90)
OVERI*EARLY_INTERNAL			-0.006 (-0.44)	-0.014 (-1.50)
OVERI	0.009 (1.07)	-0.031*** (-5.14)	0.012 (1.28)	-0.035*** (-5.16)
CONTROL VARIABLES	Included	Included	Included	Included
CONSTANT	-0.016** (-2.46)	0.057*** (3.63)	0.035* (1.69)	0.047*** (2.85)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Observations	17,419	17,419	13,265	13,265
Adjusted R-squared	0.048	0.194	0.047	0.206

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 4 (Continued)**

**Panel B**

	(1) Future_debt_ issuance	(2) Future_equity_ issuance	(3) Future_debt_ issuance	(4) Future_equity_ issuance
EARLY_PERMANENT	0.011 (0.83)	0.007 (1.09)		
OVERI*EARLY_PERMANENT	-0.002 (-0.08)	-0.004 (-0.34)		
EARLY_INTERIM	-0.016* (-1.95)	-0.004 (-0.73)		
OVERI*EARLY_INTERIM	0.006 (0.42)	-0.001 (-0.08)		
EARLY_HIGHABILITY			-0.004 (-0.40)	0.016** (2.49)
OVERI*EARLY_HIGHABILITY			0.005 (0.28)	-0.037*** (-3.09)
EARLY_LOWABILITY			-0.018* (-1.92)	0.001 (0.13)
OVERI*EARLY_LOWABILITY			0.010 (0.67)	0.002 (0.16)
OVERI	0.013 (1.04)	-0.038*** (-4.43)	0.011 (1.17)	-0.030*** (-4.89)
CONTROL VARIABLES	Included	Included	Included	Included
CONSTANT	0.059*** (2.68)	0.053** (2.51)	0.060*** (3.16)	0.066*** (4.44)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Observations	10,636	10,636	15,801	15,801
Adjusted R-squared	0.052	0.222	0.042	0.189

All variables are defined in Appendix A. Standard errors are clustered at the firm levels. \*, \*\*, and \*\*\* indicate significance levels at 10%, 5%, and 1%, respectively.

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 5**

**Robustness tests**

**Panel A: Specific types of investments**

	(1) CAPX	(2) Non-CAPX
EARLY_YEARS	-0.434*** (-2.67)	-0.688* (-1.77)
EARLY_YEARS*OVERI	0.194 (0.70)	0.857 (1.09)
OVERI	0.665** (2.09)	3.159*** (5.18)
CONTROL VARIABLES	Included	Included
CONSTANT	1.854*** (2.62)	10.418*** (8.29)
Year FE	YES	YES
Industry FE	YES	YES
Observations	21,012	21,012
Adjusted R-squared	0.530	0.212

**Panel B: Using alternative measures of OVERI**

	(1) INVT_TOT	(2) INVT_TOT
EARLY_YEARS	-0.815** (-1.99)	-0.863* (-1.80)
EARLY_YEARS*OVERINDUSTRY	0.456 (0.62)	
OVERINDUSTRY	4.276*** (7.60)	
EARLY_YEARS*OVERAGGREGATE		0.856 (0.88)
OVERAGGREGATE		-4.204 (-0.56)
CONTROL VARIABLES	Included	Included
CONSTANT	12.812*** (8.76)	17.850*** (6.65)
Year FE	YES	YES
Industry FE	YES	YES
Observations	20,679	21,012
Adjusted R-squared	0.206	0.143

# INVESTMENT EFFICIENCY DURING THE EARLY YEARS OF A CEO'S TENURE

**Table 5 (Continued)**

**Panel C: Controlling for last years of tenure**

	(1) INVT_TOT
EARLY_YEARS	-1.184*** (-2.65)
EARLY_YEARS*OVERI	1.144 (1.32)
LAST_YEARS	-0.960** (-2.36)
LAST_YEARS*OVERI	0.398 (0.51)
OVERI	4.400*** (5.48)
CONTROL VARIABLES	Included
CONSTANT	10.679*** (7.00)
Year FE	YES
Industry FE	YES
Observations	21,012
Adjusted R-squared	0.208

All variables are defined in Appendix A. Standard errors are clustered at the firm levels. \*, \*\*, and \*\*\* indicate significance levels at 10%, 5%, and 1%, respectively.